

multi-touch tablets and multi-touch display devices. More specific objects of the present invention are discussed in the detailed description section provided below.

[0011] In accordance with the present invention, a method of interfacing with a multi-point input device comprises displaying an image on a display device, detecting positions of a plurality of elements simultaneously contacting the display device, ascertaining amounts of pressure exerted by the elements on the display device, and controlling a change in the image displayed on the display device in accordance with the ascertained amounts of pressure exerted by the elements on the display device.

[0012] As an aspect of the present invention, displaying an image on a display device comprises displaying an image corresponding to a three-dimensional graphical representation of an object.

[0013] As another aspect, controlling a change in the image entails effecting a rotation of the image about an axis parallel to the display plane.

[0014] As a further aspect, controlling a change in the image entails effecting a rotation of the image about an axis parallel to the display plane, the rotation being in a direction corresponding to the ascertained amounts of pressure exerted by the elements on the display device.

[0015] As an additional aspect, controlling a change in the image entails effecting a rotation of the image about a rotation axis that is perpendicular to an axis extending through positions of first and second elements simultaneously contacting the display device.

[0016] As a feature of this aspect, the rotation axis is disposed substantially within the display plane.

[0017] As yet a further aspect, the method further comprises identifying a circle in which positions of all of the elements simultaneously contacting the display device are disposed, and controlling a change in the image entails effecting a rotation of the image about a rotation axis that extends through a centerpoint of the circle, the rotation axis being parallel to an axis extending through positions of at least two of the elements and the rotation axis being disposed substantially within the display plane.

[0018] As a further aspect, the image is displayed on a pressure-sensitive display device adapted to ascertain amounts of pressure exerted by elements contacting the display device.

[0019] As another aspect, ascertaining amounts of pressure exerted by the elements on the display device comprises ascertaining pressure as a function of an area of contact by a respective one of the elements contacting the display device.

[0020] As an additional aspect, controlling a change in the image entails ascertaining a virtual depth below a contact surface of the display device of each of the elements contacting the contact surface as a function of the amount of pressure exerted by the respective element on the contact surface, and effecting a rotation of the image in accordance with the identified virtual depths of the elements contacting the contact surface.

[0021] As yet a further aspect, the image is divided into first and second halves, and controlling a change in the image entails comparing the amounts of pressure exerted by the elements disposed on the first half of the image with the amounts of pressure exerted by the elements disposed on the second half of the image, and effecting a rotation of the image as a function of the comparison.

[0022] As yet another aspect, controlling a change in the image entails effecting, when the pressure exerted by the elements on the display device exceeds a predetermined minimum threshold, a rotation of the image about an axis in accordance with the ascertained amounts of pressure exerted by the elements on the display device.

[0023] As still yet a further aspect, detecting positions of a plurality of elements simultaneously contacting the display device comprises detecting positions of at least three elements simultaneously contacting the display device; and the method further comprises the steps of identifying a change in an attribute of any of the elements; and controlling a change in the image entails controlling a change in the image both in accordance with the ascertained amounts of pressure exerted by the elements on the display device and in accordance with the identified change in the attribute of the elements.

[0024] In accordance with another embodiment of the present invention, a method of interfacing with a multi-point input device comprises the steps of displaying an image on a display device, detecting positions of a plurality of elements simultaneously contacting a multi-point input device, ascertaining amounts of pressure exerted by the elements on the multi-point input device, and controlling a change in the image displayed on the display device in accordance with the ascertained amounts of pressure exerted by the elements on the multi-point input device.

[0025] In accordance with a further embodiment of the present invention, a multi-point input system comprises a display device for displaying an image on a display surface, the display device adapted to detect positions of a plurality of elements simultaneously contacting the display surface, and a controller for ascertaining amounts of pressure exerted by the elements on the display surface, and controlling a change in the image displayed by the display device in accordance with the ascertained amounts of pressure exerted by the elements on the display surface.

[0026] In accordance with yet another embodiment of the present invention, a multi-point input system comprises a display device for displaying an image, a multi-point input device having a contact surface, the multi-point input device adapted to detect positions of a plurality of elements simultaneously contacting the contact surface, and a controller for ascertaining amounts of pressure exerted by the elements on the contact surface, and controlling a change in the image displayed by the display device in accordance with the ascertained amounts of pressure exerted by the elements on the contact surface.

[0027] As various aspects of these systems of the present invention, the features and aspects previously mentioned with respect to the previously summarized methods of interfacing in accordance with the present invention also represent features and aspects of these system embodiments of the present invention.

[0028] Various other objects, advantages and features of the present invention will become readily apparent to those of ordinary skill in the art, and the novel features will be particularly pointed out in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029] The following detailed description, given by way of example and not intended to limit the present invention solely thereto, will best be appreciated in conjunction with the accompanying drawings, wherein like reference numerals denote like elements and parts, in which: